death (end) date to the previous current value stored in the historical TIS database and insert the new current value). A query/report application 12 will typically draw on either the current or historical TIS database, as appropriate, to respond to user requests. Because essentially the same data structure is used for each of these data sets, the same software interface can easily access both data sets. When necessary to improve performance of historical queries, the query/report application 12 will use the optimized query database 13 for certain queries and reports.

[0061] The query database 13 contains copies of some historical data in a format that is optimized to improve performance of historical queries. A maintenance application 15 will periodically update the query database 13 with the most recent historical data, and the query/report application 12 will direct some queries to the query database 13.

[0062] Referring now to Figure 2, there is shown the Anchor linear referencing method (Anchor LRM). The Anchor LRM is defined as a collection of Anchor Sections and intersections that represent the roadways that are part of the TIS data. An Anchor Section 20a-d represents a linear portion of a street, and serves, along with the length measure along the Anchor Section, as the basis for the Anchor LRM. Typically, an Anchor Section 20a-d will represent the portion of a roadway that connects two adjacent intersections, the end intersections 21 of the Anchor Section. For instance, Anchor Section 20d has end intersections 21b and 21c. However, as a road network evolves and new cross-streets are added, interior intersections 22 will be

added to the road network and, because of these interior intersections, the Anchor Sections will be topologically more complicated.

[0063] An Anchored linear event 23 is a linear portion of an Anchor Section 20, and is specified by a numeric identifier (ID) that identifies the Anchor Section. In this case, anchor section 20d, and a start 24a and end 24b offset along the Anchor Section specify the ends of the Anchored linear event. In the TIS network data model, these values are stored as integers that represent the offset in units. For example, units of 0.01% of the entire length of the Anchor Section (i.e., a value of 0 indicates the start of the Anchor Section and a value of 10000 indicates the end) are used in the exemplary embodiment. Other units may be used, as will be readily apparent to those of ordinary skill in the art. Anchored linear events are the basis for all linear references using the Anchor LRM: the location of a point event is specified as an Anchored linear event with the same start and end offset, the location of a small linear event is specified as an Anchored linear event, and the location of any other event is specified as a collection of Anchored linear events.

[0064] More detailed road network data, if required, is identified by associating additional attributes to the Anchor Section and Anchored linear event data: a "Divided Roadway Flag" indicates whether an Anchor Section is a divided roadway; a "Division Value" indicates the division(s) of an Anchor Section to which a value applies; a "Lane Count Value" indicates that number of lanes that comprise an Anchor Section; a Lane Value" indicates the lane(s) to which a value applies; and if necessary, any of the flags and values listed above can be implemented as a

segmented value, if it is important to identify that the value applies to only portions of an Anchor Section.

[0065] Figure 3 is exemplary of a portion of a road network. The Anchor Section table contains data representing the sections of roadway in the TIS Network Data Model. While this data is sufficient to store and retrieve road characteristic and other event data associated with the roadway, it is not sufficient to model navigation features of the roadway. To complete the model, the Anchor Section data is supplemented with the Intersection table that contains information about the road intersections. Referring now to Figure 3, an actual road network 300 is represented by both an Anchor Section 310 and Anchor Sections with Divisions and intersections 320. For instance, the Anchor Section representation 310 merely shows the road generally, as one Entity, with a virtual end intersection 312, representing the on/off ramps 302 of the actual roadway. The Anchor Section with Divisions and intersection representation shows multiple lanes 322a and 322b, in addition to a more complex intersection 324 which identified various points within the intersection 324a-d. Moreover, an interior intersection 326 (i.e., not located at the end of the Anchor Section) is represented. One should note that the interior intersection 326a-b is represented for each road Division 322a-b.

[0066] The maintenance process is depicted in Figure 4. Because of the considerable investment in current GIS tools for maintaining the existing road network data, modifications of existing off-the-shelf tools are used for maintaining the Anchor LRM. This approach also alleviates any difficulties that may arise during the